Photonics workstation for optical manipulation

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Optical forces have established a track-record of non-contact handling of micro particles and cells suspended in fluidic environments. We have extended this tool with a multi-beam optical trapping setup based on counterpropagating beam geometry. This system is capable of dynamic 3D positioning of particles with real-time user control. However, due to the serial nature of a modern mouse-driven user interface, a dynamic many-particle experiment can be difficult for the operator to handle. Here we present the trapping method and how to extend the capability of the user by using computer assisted trapping, and how the feedback for the computer can be enhanced. As a demonstration the system are used for controlling microfabricated tools and assemble custom made building blocks.